WE CLAIM:

1. A purified and isolated nucleic acid molecule comprising a sequence encoding an Ste20-like kinase protein (SMAK).

2. A purified and isolated nucleic acid molecule according to claim 1 wherein the protein has about 70% homology to LOK, about 65% homology to M-NAP and about 60% homology to AT1-46, and an approximate molecular weight of about 148 kDa.

3. A purified and isolated nucleic acid molecule as claimed in claim 1, comprising (i) a nucleic acid sequence encoding a SMAK protein having the amino acid sequence as shown in Figure 2; and, (ii) nucleic acid sequences complementary to (i).

4. A purified and isolated nucleic acid molecule as claimed in claim 1, comprising

(i) a nucleic acid sequence encoding a SMAK protein having the nucleic acid sequence as shown in Figure 1, wherein T can also be U;

(ii) a nucleic acid sequence complementary to (i);

(iii) a nucleic acid molecule differing from any of the nucleic acids of (i) and (ii) in codon sequences due to the degeneracy of the genetic code.

5. A purified and isolated nucleic acid molecule comprising a sequence which hybridizes to the nucleic acid molecule as claimed in claim 3.

6. A recombinant expression vector adapted for transformation of a host cell comprising a nucleic acid molecule as claimed in claim 1 and one or more transcription and translation elements operatively linked to the nucleic acid molecule.

7. A host cell containing a recombinant expression vector as claimed in claim 6.

8. A method for preparing a SMAK protein comprising (a) transferring a recombinant expression vector as claimed in claim 6 into a host cell; (b) selecting a transformed host cell from untransformed host cells; (c) culturing the selected transformed host cell under conditions which allow expression of the SMAK protein; and (d) isolating the SMAK protein.

9. A purified and isolated SMAK protein.

10. A purified and isolated SMAK protein according to claim 9 wherein the SMAK protein has about 70% homology to LOK, about 65% homology to M-NAP and about 60% homology to AT1-46, and an approximate molecular weight of about 148 kDa.

11. A purified and isolated protein as claimed in claim 9 or 10, which has the amino acid sequence as shown in Figure 2, or a fragment, analog or derivative thereof.

sub a2

12. Antibodies having specificity against an epitope of the SMAK protein as claimed in claims 9-11.

13. A nucleotide probe comprising a sequence encoding at least 6 continuous amino acids from the SMAK protein shown in Figure 2.

14. A method of modulating apoptosis comprising administering an effective amount of a SMAK protein or a nucleic acid encoding a SMAK protein to a cell or animal in need thereof.

15. A method according to claim 14 wherein the SMAK protein has the amino acid sequence shown in Figure 2 or a fragment thereof.

sub a3

16. A method according to claim 14 wherein the nucleic acid molecule encoding the SMAK protein has the sequence shown in Figure 1.

17. A method of modulating cell proliferation comprising administering to the cell an effective amount of an agent which inhibits the expression or activity of SMAK protein.

18. A method according to claim 17 wherein the agent is an antibody to a SMAK protein.

19. A method according to claim 17 wherein the agent is an antisense molecule that is complimentary to a nucleic acid molecule encoding a SMAK protein.

20. A method according to any one of claims 17 to 19 wherein the cell is in an animal.

21. A purified and isolated polypeptide which has an amino acid sequence of an ATH domain of SMAK protein.

22. A method of modulating apoptosis comprising administering to a cell an effective amount of a polypeptide which has an amino acid sequence of an ATH domain of a SMAK protein.

23. A method according to claim 22 wherein the cell is in an animal.

24. A purified and isolated polypeptide with an amino acid sequence of the N terminal domain of a SMAK protein.

25. A method of modulating apoptosis comprising administering to a cell an effective amount of polypeptide which has an amino acid sequence of the N terminal domain of a SMAK protein.

26. A method according to claim 25 wherein the cell is in an animal.

27. A method for identifying a substance which is capable of binding to a purified and isolated SMAK protein as claimed in claim 9, comprising reacting the protein with at least one substance which potentially can bind with the protein under conditions which permit the formation of complexes between the substance and the protein, and assaying for complexes, for free substance, for non-complexed protein, or for activation of the protein.

28. A method for assaying a medium for the presence of an agonist or antagonist of the interaction of a purified and isolated a SMAK protein as claimed in claim 9 and a substance which binds to the protein which comprises reacting the protein with a substance which is capable of binding to the protein and a suspected agonist or antagonist substance under conditions which permit the formation of complexes between the substance and the protein, and assaying for complexes, for free substance, for non-complexed protein, or for activation of the protein.